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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,250	03/30/2004	Michael A. Schultz	108524	4825

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HONEYWELL INTELLECTUAL PROPERTY INC  
PATENT SERVICES  
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MORRISTOWN, NJ 07962

EXAMINER
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DOUGLAS, JOHN CHRISTOPHER

ART UNIT	PAPER NUMBER
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1797

MAIL DATE	DELIVERY MODE
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11/21/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/813,250	<b>Applicant(s)</b> SCHULTZ ET AL.	
	<b>Examiner</b> John C. Douglas	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 14 September 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 3-8, 11, 23, 24 and 27-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-8, 11 and 28-31 is/are allowed.
- 6) ☒ Claim(s) 23, 24, 27 and 32-44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/14/2007 has been entered.

### ***Response to Amendment***

Examiner acknowledges the amendments to the claims filed on 9/14/2007. A new rejection follows.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 32-39, 41, 42, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy in view of Bal, Wessels (US 4354929), and Ramirez de Agudelo (US 6019887).
2. With respect to claims 32, 34, 35, 23, and 24, Tsybulevskiy discloses where a hydrocarbon stream containing sulfoxides is contacted with a zeolite adsorbent to produce a hydrocarbon stream having a reduced concentration of sulfoxides (see Tsybulevskiy, paragraphs 2 and 26). Tsybulevskiy does not disclose where the adsorbent is contacted with a desorbent to produce a desorbent containing the sulfur compounds and an adsorbent having a reduced content of the sulfur compounds, does not disclose where the adsorbent with reduced sulfur is contacted with a hydrocarbon stream containing sulfur, does not disclose a purge stream boiling lower than the

desorbent, and does not disclose fractionating the desorbent containing sulfur compounds to obtain a desorbent with reduced sulfur.

However, Bal discloses desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent (see Bal, column 1, line 65 – column 2, line 8 and claim 1).

Bal discloses that the desorbent is used to regenerate the adsorbent (see Bal, column 1, lines 60-65).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent in order to regenerate the adsorbent.

Also, it would have been obvious to contact the regenerated adsorbent with a hydrocarbon stream so that the adsorbent can remove sulfur from the hydrocarbon stream.

In addition, Wessels discloses the use of n-hexane as a purge to sweep out hydrocarbons from the adsorbent (see Wessels, column 1, lines 21-27).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include the use of n-hexane as a purge in order to sweep out hydrocarbons from the adsorbent.

Also, Ramirez discloses where a purge stream to purge an adsorbent can consist of hydrocarbons with C1-C16 carbon atoms and the desorbent can be methanol (see Ramirez, column 7, lines 11-20 and Example 9). Therefore, it would have been obvious

to include where the purge is heavier than the desorbent, because such a heavy purge is suitable for purging an adsorbent (see Ramirez, column 7, lines 11-20).

3. With respect to claims 33 and 42, Tsybulveskiy discloses desulfurizing a diesel fuel with an adsorbent (see Tsybulveskiy, paragraph 16).
4. With respect to claim 36, Tsybulevskiy discloses an adsorbent that has an adsorption capacity of 0.62 wt% for a sulfoxide (see Tsybulevskiy, example 11, Table 4).
5. With respect to claim 37, Tsybulevskiy discloses where the adsorption contacting step is conducted at temperatures in the range of 10 to 40 degrees C and pressures in the range of 300 to 6000 kPa (3 to 60 bars) (see Tsybulevskiy, paragraph 48).
6. With respect to claim 38, Bal discloses where the desorbent is introduced at temperatures between about 27 degrees C to about 400 degrees C (see Bal, column 3, lines 21-25).
7. With respect to claim 39, Bal discloses where the desorbent is toluene (see Bal, column 3, lines 46-51).
8. With respect to claim 41, Bal discloses recycling the desorbent to the desorbing step (see Bal, column 1, lines 43-53).
9. Claims 40, 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy in view of Bal and Wessels as applied to claim 32 above, and further in view of Rice (US 6395950).

10. With respect to claim 40, Tsybulevskiy in view of Bal disclose everything in claim 28, but do not disclose where the fractionating step is conducted in a split shell fractionation step.

Rice discloses a fractionation zone with a vertical partition (see Rice, column 18, lines 23-45).

Rice discloses that such a distillation column with a vertical partition reduces capital costs as well as utility costs when compared to a traditional distillation column (see Rice, column 16, lines 26-43).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy in view of Bal and Wessels to include a fractionation zone with a vertical partition in order to save on capital costs and utility costs.

11. With respect to claims 43 and 44, Wessels discloses where the n-hexane purge is fractionated to produce an n-hexane overhead fraction that is recycled for use as purge gas (see Wessels, column 2, lines 10-23).

12. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsybulevskiy in view of Bal, Wessels, and Rice (US 6395950). Tsybulevskiy discloses where a hydrocarbon stream containing sulfoxides is contacted with a zeolite adsorbent to produce a hydrocarbon stream having a reduced concentration of sulfoxides (see Tsybulevskiy, paragraphs 2 and 26). Tsybulevskiy does not disclose where the adsorbent is contacted with a desorbent to produce a desorbent containing the sulfur compounds and an adsorbent having a reduced content of the sulfur compounds, does

not disclose where the adsorbent with reduced sulfur is contacted with a hydrocarbon stream containing sulfur, does not disclose split shell fractionation, and does not disclose fractionating the desorbent containing sulfur compounds to obtain a desorbent with reduced sulfur.

However, Bal discloses desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent (see Bal, column 1, line 65 – column 2, line 8 and claim 1).

Bal discloses that the desorbent is used to regenerate the adsorbent (see Bal, column 1, lines 60-65).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include desorbing sulfur compounds from an adsorbent and treating the desorbent to remove sulfur from the desorbent in order to regenerate the adsorbent.

Also, it would have been obvious to contact the regenerated adsorbent with a hydrocarbon stream so that the adsorbent can remove sulfur from the hydrocarbon stream.

In addition, Wessels discloses the use of n-hexane as a purge to sweep out hydrocarbons from the adsorbent (see Wessels, column 1, lines 21-27). Wessels also discloses where the n-hexane purge is fractionated to produce an n-hexane overhead fraction that is recycled for use as purge gas (see Wessels, column 2, lines 10-23).



Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy to include the use of n-hexane as a purge in order to sweep out hydrocarbons from the adsorbent.

Rice discloses a fractionation zone with a vertical partition (see Rice, column 18, lines 23-45).

Rice discloses that such a distillation column with a vertical partition reduces capital costs as well as utility costs when compared to a traditional distillation column (see Rice, column 16, lines 26-43).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the process of Tsybulevskiy in view of Bal to include a fractionation zone with a vertical partition in order to save on capital costs and utility costs.

***Allowable Subject Matter***

13. Claims 28-31, 3-8 and 11 are allowed.

14. The following is an examiner's statement of reasons for allowance: the prior art does not disclose introducing a desorbent containing sulfur-oxidated compounds into a high sulfur, lower end zone of a split shell fractionation column and introducing an initial portion of the effluent of the stream sent to the high sulfur, lower end zone of a split shell fractionation zone comprising desorbent into a low sulfur, lower end zone of the split shell fractionation zone.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Response to Arguments***

Applicant first argues that the split shell fractionation limitation of claim 27 was not addressed. The rejection of claim 27 now covers this limitation.

Applicant next argues that there is no motivation to combine the Rice reference with Tsybulevskiy or Bal. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Rice discloses that such a distillation column with a vertical partition reduces capital costs as well as utility costs when compared to a traditional distillation column (see Rice, column 16, lines 26-43). In addition, it would have been obvious to one having knowledge in the art to perform the separation steps needed to obtain the desired end product, since fractionation for this purpose is already known in the art (see Rice, Rice, column 18, lines 23-45).

The arguments with respect to claims 28 and 32 are moot because of the new rejection of claim 32 and the allowance of claim 28.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Douglas whose telephone number is 571-272-1087. The examiner can normally be reached on 7:30 A.M. to 4:30 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

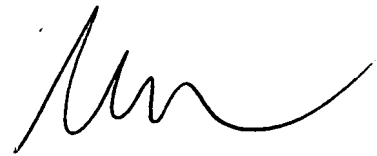
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JCD

11/18/2007

A handwritten signature in black ink, appearing to read 'Glenn Caicarola', with a stylized, flowing script.

Glenn Caicarola  
Patent Examiner  
Technology Center 1700